

slightly tapered and a tapered flat is milled on one side of the binder. When the fixture is loaded the spring *D* forces the bunter up against the work, and by means of the cam *C* the binder is pulled outward and holds the bunter firmly in place. The double taper on both bunter and binder makes it impossible to press the bunter downward away from the work.

**Conclusion.** — When designing clamping devices, as few operating screws or handles should be used as will accomplish the desired result, for it takes considerable time to turn a screw one or two revolutions four or five thousand times a day, which is an average number of operations for many jigs. Making the screw with a double or triple thread is sometimes done to advantage in decreasing the number of turns necessary to release the piece. Jig lids should be hung on taper pins in order that wear in the hinge may be compensated for and the resulting inaccuracy due to the lost motion in the hinge prevented. The included angle of taper on hinge pins should be only one or two degrees and the pins should be spirally grooved to within  $\frac{1}{8}$  inch of each end, in order to hold oil for lubricating the hinge after the pin is driven in. The hinge pin should be a tight fit in the central portion of the hinge, which is usually the jig body, and a bearing fit in the ears of the lid. In this manner the greatest wearing surface possible is obtained.

All clamping screws and similar parts should be long enough and so located as to be conveniently taken hold of to operate, and of sufficient size to prevent hurting the operator's hands on account of the pressure necessary to manipulate them. The screws should be located so that they will resist the tilting action of the block, and the dowel pins should be fairly close to the screws and of liberal dimensions in order to resist the shearing strains to which they will be subjected. When clamping or locating the work in the jig, it is essential to have the clamping pressure exerted in a direct line against some solid point of support to prevent the tilting tendency, and the thrust should also come on such a point of the work that it will be resisted by solid metal, as the pressure of a screw is frequently underestimated by both the designer and the operator of the